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Study of the helminth fauna of the seals of the Baltic Sea and Lake Ladoga

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Study of the helminth fauna of the seals of the Baltic Sea and Lake Ladoga

by S.L. Delyamure, V.N. Popov and A.N. Trashchenkov

We studied the helminthologic material from 5 Baltic seals (Pusa hispida botnica), 18 Ladoga seals (P. h. ladogensis) and one grey seal (Halichoerus grypus), and recorded 8 species of helminths. For the first time, we discovered the nematode Dipetalonema spirocauda in the Ladoga seal; the cestode Schistocephalus solidus, the larvae of Diphyllobothriidae gen. sp., the acanthocephalans Corynosoma magdaleni, C. semerme and C. strumosum, as well as the nematodes Contracaecum osculatum and Parafilaroides gymnurus in the Baikal seal, and the nematode C. osculatum in the grey seal. The nematode P. gymnurus is also described again. The extensiveness and intensity of infestation are discussed, and the significant depauperation of the species composition of helminths in relict forms of pinnipeds is noted.

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The Baltic seal (Pusa hispida botnica) and Ladoga seal (P. h. ladogensis) have not been studied sufficiently from the point of view of helminthology. Until recently, only one species of nematodes, Terranova decipiens (Krabbe, 1873) was known for the Baltic seal [2], and Corynosoma strumosum (Rudolphi, 1802), C. semerme (Forssell, 1904) and immature Diphyllobothrium sp. were known for the Ladoga seal [1]. It should be said that the Ladoga seal has been included in the Red Book of the USSR, and this determines the urgency of studying its parasite fauna.

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During 1971-1973, with the cooperation of the Marine Mammal Laboratory of the Atlantic Scientific Research Institute of Fishery and Oceanography (AtlantNIRO), we succeeded in collecting helminthologic material from 18 Ladoga male and female seals 1-28 years of age, and from 4 mature females of the Baltic seal caught in the Gulf of Finland. All the animals were examined by the combined method of partial dissection of the animals and complete helminthologic dissections of individual organs [7]. In addition, AtlantNIRO researcher G.V. Rezvov gave us some collections of helminths from the gastrointestinal tract of a Baltic seal and from the stomach of a grey seal (Halichoerus grypus), both caught in the Gulf of Finland.

As a result of our study of this material, we recorded 8 species of helminths, including 2 species of cestodes (one immature and one larval form), 3 species of acanthocephalans, and 3 species of nematodes. Data on the localization of the helminths, and on the intensity and extensiveness of infestation of the Baltic and Ladoga ringed seals by various helminth species are presented in the table below.

Plerocercoids of the species Schistocephalus solidus (Muller, 1776) were found in different parts of the intestine of three Baltic seals. In order to study the degree of maturity, we examined in detail 15 specimens of these cestodes measuring 42-65 mm in length and 7-10 mm in width. Their strobilae consist of 95-143 segments, and the proglottids in the middle part of the body have a developed reproductive system, but eggs were not found in them, i.e. the S. solidus from the intestine of the seal do not differ morphologically from the infective plerocercoids

that parasitize the body cavity of fish. As we know, the intermediate hosts of S. solidus [5] are the threespine stickleback (Gasterosteus aculeatus) and some species of sculpins (Cottus gobio, etc.) which apparently infect the seals, the reserve hosts of this cestode.

In the small intestine of 3 Baltic seals and one Ladoga seal, we found cestode larvae measuring 6.3-19.0 mm in length, with a maximum width of 0.31-0.55 mm and two weakly defined bothria, which can be related to the Diphyllobothriidae family on the basis of the scolex structure. (44)

Infestation of the Baltic and Ladoga seals with helminths

Species of helminths	Localization	Baltic seal (5 specimens)			Ladoga seal (18 specimens)		
		Extensiveness of infestation		intensity of infestation (lim)	Extensiveness of infestation		Intensity of infestation (lim)
		absol.	%		absol.	%	
Schistocephalus solidus	Intestine	3	60	2-34	-	-	-
Diphyllobothriidae gen. sp.	Small intestine	3	60	1-3	1	5.5	2
Corynosoma magdaleni	Small intestine	3	60	7-63	-	-	-
C. semerme	Large intestine	5	100	41-182	18	100.0	47-273
C. strumosum	Small intestine	5	100	4-27	18	100.0	21-148
Contracaecum osculatum	Stomach and intestine	1	20	2	-	-	-
Dipetalonema spirocauda	Heart	-	-	-	4	22.2	1-4
Parafilaroides gymnurus	Lungs	1	25	53	-	-	-

Note: Lungs examined in 4 Baltic seals

The acanthocephalans are represented by three species in our material. Corynosoma strumosum and C. semerme were recorded in both subspecies of hosts, while C. magdaleni Montreuil, 1958 was found only in the Baltic seal; furthermore, the latter was recorded for the first time in this particular host and for the first time in the Baltic Sea area.

The stomach of the grey seal and the intestine of a Baltic seal were infested with Contracaecum osculatum (Rudolphi, 1802) in quantities of 126 and 2 worms respectively. This nematode was recorded for the first time in Baltic seals.

Fifty-three specimens of Parafilaroides gymnurus (Railliet, 1899) were detected in the lungs of a Baltic seal from the Gulf of Finland. They were localized in the bronchia, bronchioles and lung tissue; suppuration and local hemorrhaging were observed in in the places where the parasites had become embedded in the lung tissue. Since this nematode has been recorded in the Baltic Sea area for the first time and the descriptions available on this species in the literature are rather incomplete [2, 8], we are redescribing P. gymnurus on the basis of our study of 4 male and 3 female specimens.

Description of species. These are thread-like, light-grey nematodes which are slightly tapered anteriorly and posteriorly. The cuticle is thin, translucent, with indistinct striation. The anterior end of the body bears no perceptible elements of armour. The females are about 1.5 times larger than the males. The width of the anterior part of the intestine is 2.5-4 times greater than the maximum width of the digestive tract.

The male is 9.1-10.6 mm long with a maximum width of 0.087-0.112 mm. The body measures 0.048-0.061 mm in width at the level where the digestive tract ends, and 0.031-0.037 mm at the level of the distal end of the spicules. The digestive tract measures 0.122-0.135 mm in length, widens slightly toward the posterior end, and has a maximum width of 0.011-0.014 mm. The nerve ring is 0.059-0.061 mm away from the anterior end. The anterior part of the intestine measures 0.054-0.059 mm in width. The cloaca is 0.010-0.012 mm away from the posterior end of the body. The spicules are flattened, narrowed distally, and measure 0.037-0.046 mm in length with a maximum width of 0.003-0.005 mm. The gubernaculum is slender, slightly curved, and 0.010-0.013 mm long.

(45)

The female measures 13.2-16.4 mm in length with a maximum width of 0.093-0.132 mm. The body is 0.058-0.072 mm wide at the level where the digestive tract terminates, and 0.027-0.032 mm at the level of the vulva. The digestive tract measures 0.136-0.158 mm in length with a maximum width of 0.014-0.018 mm. The nerve ring is 0.045-0.055 mm away from the anterior end. The anus is located 0.024-0.028 mm from the posterior end of the body, and the vulva is located directly in front of it.

The reproductive system consists of paired ovaries, oviducts and wombs, as well as an unpaired vagina and vulva. The thread-like ovaries are found in the anterior half of the body; their width gradually increases from 0.018-0.021 to 0.036-0.045 mm. The oviducts are somewhat thinner than the terminal parts of the ovaries, and have a diameter of 0.028-0.032 mm. The womb expands from 0.032-0.046 to 0.078-0.102 mm. The posterior parts of the

womb and the vagina are filled with spirally curved larvae 0.245-0.318 mm long.

Dipetalonema spirocauda (Leidy, 1858) were for the first time detected in the heart of 4 of the 18 Ladoga seals examined. One of the distinctive features is that only young seals 1-4 years of age were among those infested with this nematode. All of these animals were highly emaciated, and differed noticeably in their appearance from the other animals of the same age. Our observations confirm the published data [3, 6, 9] that D. spirocauda causes severe diseases among seals.

A comparison of the species composition of the helminths that parasitize three subspecies of the ringed seal has shown that unlike the nominal subspecies Pusa hispida hispida, P. h. ladogensis and P. h. botnica are characterized by a scant helminth fauna. This once again confirms V.A. Dogel's opinion [4] that the parasite fauna of the relict forms is not as abundant as in the related species inhabiting the initial range.

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